VATIS Update Ozone Layer Protection . Nov-Dec 2005

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THE SCIENCE OF OZONE LAYER

Ozone hole 2005: One of the deepest and largest recorded

The 2005 ozone hole is one of the deepest and largest recorded, according to the British Antarctic Survey Ozone Bulletins October issue. The atmospheric circulation over the Antarctic continent is emerging from its winter state. Temperatures in the stratosphere have been cold enough for stratospheric clouds to form and though temperatures are rising, they are still widespread.

There is widespread ozone depletion over the continent, with ozone amounts more than 50 per cent below the normal for the time of year in many places. Lowest ozone amounts are below 100 DU, with all the edge region areas below 200 DU, though amounts are beginning to rise. The lowest ozone areas are near Halley. Overall, the area of the ozone hole is around 22 million sq. km but is a little smaller in size than the 2003 hole, which was one of the largest on record. It is a little smaller than its peak of 25 million sq. km in early September. Ozone values at Rothera in September were among the lowest recorded at this time of year, and values around 110 DU were reached on September 11, 19 and 20. The tip of South America and the Falkland Islands were affected by the edges of the ozone hole between August 30 and September 2; September 10 and 12; September 16 and 18; and September 25 and 27. During these periods values dropped to over 20 per cent below the normal for the time of year, and most recently have been over 30 per cent down, with values below 200 DU. The region is likely to be affected by severe ozone depletion from October 8 to 10, when ozone amounts may drop 50 per cent below the normal levels.

Website: www.theozonehole.com

Antarctic ozone hole may have peaked, WMO says

The size of the ozone hole above the Antarctic this year was third largest in size but it was not completely apparent what it would do in the future, stated experts from the World Meteorological Organization (WMO). The ozone hole expanded to a size of about 27 million sq. km in September and began shrinking afterwards. According to WMO specialists, drastic increase of the ozone hole is not expected in the near future since, they believe, it has peaked and reached its plateau.

The ozone hole peaked at 26.9 million sq. km on September 19, WMO said, against the 29 million sq. km in September 2003, which most scientists consider as the record. According to Dr. Geir Braathen, WMOs top ozone expert, It is the third largest ever, more or less as one would expect from present levels of chlorine and bromine in the atmosphere. Adding that it didnt look as if the ozone hole was going to get any bigger in coming years, Dr. Braathen said that the amount of chlorine and bromine will continue to decline over the next decades, but very slowly, and one expects the ozone hole to get smaller and smaller. Uncertainties, however,

remained regarding the pace of the ozones recovery, according to the Norwegian expert.

Websites: www.focus-fen.net & www.today.reuters.com

Ozone hole gets smaller while the ocean gets warmer

The environmental health of Antarcticas ocean and its ozone layer appear to be poles apart, with both good and bad news on the battle to curb damaging atmospheric change. The bad news is that scientists working with the British Antarctic Survey have found that the ocean west of the Antarctic Peninsula has warmed by more than a degree since the 1960s. The rise in temperature threatens to disrupt populations of penguins, seals, whales and a host of smaller creatures within a few decades. These findings have confounded computer models and experts who believed a combination of ice, winds and currents would keep the water cool and shield fragile marine creatures.

The good news is that ozone layer depletion above the South Pole, caused by emissions of industrial chemicals, seems to have peaked. The latest bulletin from the World Meteorological Organization said the seasonal ozone hole has shrunk. It peaked at 26.9 million sq. km on September 19, against 29 million sq. km in September 2003.

Website: www.smh.com.au

ODS PHASE-OUT IN INDIA

Halon phase-out, a success story in India

India is scripting a success story in phasing out ozone-depleting halons, according to speakers at a conference on Halon Phase Out, organized by the Bureau of Indian Standards (BIS). Ever since India became a signatory to the 1992 Montreal Protocol, the BIS has formulated 13 standards for halon-alternative technologies. The technical committees have updated 26 more standards, said Mr. J.C. Arora, director and head of Civil Engineering Department, BIS. As per the Protocol, India has to achieve total phase-out by 2010.

India stopped production of halons in 1998. Only limited use is permitted for critical applications, said Mr. H.S. Kaprwan, National Project Director of United Nations Development Programme, the international implementing agency. All national standards were prepared well in time, a first in developed countries.

In fire extinguishing systems, new halon alternatives such as carbon dioxide, heptafluropropane, argonite, inergen, HFC 23, triodide, water mist, pyrotechnic aerosols and fluroketones have been identified. The Defence Institute of Fire Research, the executing agency of the project, has constituted a Halon Alternative Option Committee for phasing out halons in fire safety and the BIS is actively involved. Formulation of new standards has been done within two years. Standardization efforts will continue to be up to date in fire protection strategies.

Website: www.hindu.com

CTC consumption phase-out in metal cleaning sub-sector

The demand for carbon tetrachloride (CTC) in India for applications such as metal cleaning is more than 40,200 MT per year. A new CTC phase-out plan Carbon Tetrachloride Consumption Phase Out in the Metal Cleaning Sub-sector will aid Indias plans to completely phase out CTC production and consumption by December 2009.

The phase-out plan is financed by the Multilateral Fund and represents Japans bilateral contribution to phase out the use of up to 533 ODP tonnes of CTC used in four enterprises and their subsidiaries in the metal cleaning sector by end of 2005. The Ozone Cell of the Ministry of Environment and Forests is the executing agency, while the United Nations Development Programme is one of the main implementing agencies for this project. Other project partners are the World Bank, the United Nations Environment Programme, the United Nations Industrial Development Organization and the German development agency GTZ.

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E-mail: sunil.arora@undp.org Or Dr. A. Duraisamy, Director / Dr. S. Satapathy, National Prog. Manager, MOEF, Ozone Cell

E-mail: ozone@del3.vsnl.net.in

Website: www.undp.org.in

ODS phase-out in industries gains momentum

About 55 ODS-consuming industries have been identified in the state of Tamil Nadu, according to Mr. Charles Rodriques, Environmental Engineer and officer-in-charge of the Ozone Monitoring Cell in the states Pollution Control Board. They have been advised to follow the schedule for phasing out ODS in accordance with the national strategy. New industries are not permitted to use ODS.

Phasing out of ODS gained momentum in leading companies like Manali Petrochemicals Ltd. (MPL) at Chennai. MPL has developed and commercialized water-blown system for the manufacture of PU foam for seats of two-wheelers and four-wheelers, said Dr. R. Rajan, senior manager of R&D at MPL.

Chola Sheraton, in Chennai, Tamil Nadu recently introduced non-CFC screw chiller 250 TR. Cold storages and deep freezers have also been converted similarly to ensure zero ozone depletion, according to Mr. Sajeev Paul, Chief Engineer at the hotel. The hotel has stopped using CFC-type room fresheners and replaced all halon-based fire extinguishers. The Welcome Group of hotels is planning an ozone infusion system for the swimming pool

Website: www.chennaionline.com

IN THE NEWS

Use of ODS falls 53 per cent in Bangladesh

The use of ozone depleting substances (ODS) has decreased by 53 per cent in Bangladesh during the last four years, said officials from the countrys Environment Directorate. The highest ever use of ODS, amounting to 946.80 tonnes, was in 1999. It has come down to 460.50 tonnes this year.

The Environment Directorates director general said that the government had adopted massive initiatives on environment issues according to the Montreal protocol for reducing the use of ODS. National ODS phase-out plan has been formulated with an aim to decrease the use of ozone layer depleting substances by 85 per cent in 2007 and by 100 per cent in 2010, he said. According to environment experts, the use of ODS in Bangladesh, as in other developing countries, is quite minimal compared with the ODS use in the developed countries.

Website: www.financialexpress-bd.com

Chinese bid to save ozone layer

In China, 11 provinces and cities have recently pledged to phase out major ozone-depleting substances (ODS) by next July, paving the way for nationwide participation one year later. The programme, initiated by Guangdong City, includes the revision of policies, laws and regulations on production, sales and use of ODS, severely cracking down on the illegal production of ODS and encouraging the production of ODS substitutes.

Website: www.thestar.com.my

Private sector contributes to Indonesias ODS phase-out

Together with the Ministry of Environment (KLH), the United Nations Development Programme (UNDP), has distributed recovery and recycling equipment to 188 enterprises in Indonesia in the refrigeration (servicing) sector, thereby phasing out the annual consumption of over 50 MT of chlorofluorocarbons (CFCs). In addition to the servicing enterprises, 60 training institutions were also provided with the same equipment to be used in technicians training.

The Government of Indonesia in 1992 ratified both the Vienna Convention and the Montreal Protocol, and set the target of CFCs phase-out as the end of 2007.
With the support from UNDP one of the implementing agencies of the Multilateral Fund for the Implementation of Montreal Protocol Indonesia has executed a total of 29 individual investment projects in the foam sector and 14 such projects in the refrigeration sector, phasing out 498 MT and 117 MT of ozone depleting potential, respectively. Indonesia received a total of US$15.6 million from the Fund to phase out about 3,200 MT of CFCs in the refrigeration manufacturing, refrigeration servicing and mobile air-conditioning sub-sectors.
The recent signing of the Statement of Completion (SOC) for 36 servicing enterprises and 19 training institutions in Jakarta is considered a major step towards enterprises contribution to ODS phase out in Indonesia.

The SOC transfers the ownership of the equipment from UNDP and KLH to the enterprises. The servicing enterprises will utilize the equipment to improve their competitiveness in the market and to maintain employment, while the training institutions will use it as demonstration tools in training technicians in best

practices in refrigeration. Both will continue their efforts on ODS phase-out in Indonesia and contribute to the Millennium Development Goal of ensuring environmental sustainability.

Website: www.undp.or.id

Nepals ODS phase-out efforts lauded at South Asia Ozone Officers Meet

Speakers at the four-day meeting of South Asia Network of Ozone Officers lauded Nepals efforts in phasing out ozone depeleting substances. The meeting and a two-day thematic meeting on Challenges to Phase Out Methyl Bromide were both inaugurated by the Crown Prince of Nepal Mr. Paras Bir Bikram Shah Dev in a function held on 3 October 2005.

Representatives from 13 member countries of the network as well as from the United States of America, Japan, Australia and Germany and Implementing Agencies of the Multilateral Fund took part in the meeting. The Nepal Bureau of Standards and Metrology organized the meeting with support from the Regional Office for Asia & Pacific OzonAction Programme of the United Nations Environment Programme (UNEP).

Speaking at the inaugural function, Mr. Kirti Nidhi Bista, Vice Chairman of the Council of Ministers, said Nepal is concerned about the production, use and transfer of ozone layer depleting substances. Mrs. Monique Barbut, Director of UNEPs Technology, Industry and Economics Division, lauded the role played by Nepal in stopping the use of harmful chemicals as per the commitments made at the global level. The Director General of Nepal Bureau of Standards and Metrology Mr. Shreekrishna Shrestha said significant works have been done since the constitution of the National Ozone Unit in 1996.

Contact: Dr. Sita Ram Joshi, Chief Metrologist, Nepal Bureau of Standards & Metrology, Ministry of Industry, P.O. Box 985, Balaju, Kathmandu, Nepal. Tel: +9771 356 672, 350 818; Fax: +9771 350689, 533 179

E-mail: ozone@ntc.net.np

www.nbsm@nbsm.gov.np

Refrigerant identifiers set up in major Philippine ports

The Environmental Management Bureau Philippine Ozone Desk (EMB-POD) has handed over 30 units of Neutron Refrigerant Identifiers to the Bureau of Customs (BOC), as part of the Memorandum of Understanding signed in 2002 between the two agencies. The refrigerant identifiers, to be set up in 15 major ports of BOC, will be used to prevent illegal importation of ozone depleting substances like CFC-12.

The refrigerant identifiers have already been endorsed to the District Commanders of six major ports: MICP, Port of Manila, Ninoy Aquino International Airport, Port of Clark in Pampanga, Port of Zamboanga and Port of Davao. Upon arrival of a suspicious shipment of refrigerants, the identifier will be used to test whether the refrigerants are genuine as declared. It will distinguish the percentage of R-12, R-134a, R-22, hydrocarbon and air in the actual content of cylinders. It will also indicate whether the quality of the refrigerant is PASS or

FAIL.

Website: www.emb.gov.ph

Viet Nam to get Multilateral Fund grant for ODS phase-out

The Multilateral Fund has pledged to provide US$ 1.26 million in non-refundable aid to projects that will phase out ozone depleting substances in Viet Nam for the 2005-10 period. Initially, the Fund will deliver refrigeration facilities and automobiles worth between US$600,000 and US$650,000 to about 700 production establishments in Viet Nam.

The Ministry of Natural Resources and Environment, with assistance from the World Bank, had recently mapped out a national plan to completely phase out chlorofluorocarbons (CFCs) and halons in the 2005-09 period. In the past 10 years, the Multilateral Fund had granted Viet Nam more than US$4 million for protecting the ozone layer. As a result, the country has reduced the annual volume of CFCs used in industrial production by half (250 tonnes), fulfilling its international commitment to the Vienna Convention and the Montreal Protocol.

Website: www.vnagency.com.vn

Methyl bromide phase-out gets under way in the Philippines

The Philippine Fertilizer and Pesticide Authority (FPA) has set into motion the control and regulation part of the Methyl Bromide (MB) Phase-out Project. Under this, the issuance of Certificate Authorizing Importation of Pesticide (CAIP) needs the submission of disposition report from the importer/distributor and an understanding that sale will be made only to purchasers with valid permit to purchase MB issued by FPA.

Pesticide Control Operators (PCOs) are required to submit disposition reports and information on the intended use of MB before issuance of a permit to purchase MB. In addition, quarantine fumigation conducted must be supported by a phytosanitary or fumigation certificate issued by the Bureau of Plant Industry (BPI) Quarantine Service. Institutional users, such as flourmills that import MB in 100 kg cylinders, shall be automatically subjected to a 20 per cent import reduction to be specified in the CAIP.

Although quarantine and pre-shipment (QPS) fumigation are not subject to the phase-out schedule, certificates issued by BPI for these purposes will be the basis of FPA in identifying non-QPS MB uses. BPI Quarantine Service will furnish FPA with a quarterly report of QPS treatments or MB fumigation supervised by its personnel. This report will be the basis of FPA in verifying and validating disposition report submitted by PCOs and in establishing non-QPS fumigation for reporting to the Montreal Protocol Secretariat.

Other related developments included a seminar/workshop for government agencies involved in the project, an orientation seminar on the National MB Phase-out Strategy for BPI quarantine officers and customs and FPA field personnel, and the second meeting of the MB Technical Advisory Committee.

Website: www.emb.gov.ph

Philippines disburses grants for environment-friendly tools

Twenty-four refrigeration and air-conditioning service shops in Quezon City, the Philippines, were provided with grant assistance to purchase tools and equipment for proper servicing, maintenance and installation of refrigeration and air-conditioning (RAC) and mobile air-conditioning (MAC) systems. The grants, made available by the Department of Environment and Natural Resources (DENR) through a voucher system, seeks to encourage the RAC and MAC servicing sectors to observe environment-friendly servicing practices and do away with the use of ozone-depleting substances such as the CFCs.

Website: www.denr.gov.ph

REFRIGRATION/AIR-CONDITIONING

Zero ODP frictionless chiller

AEC Inc., Illinois, the United States, has introduced the latest addition to its heating and cooling line with Model RTCW frictionless chiller, which represents a savings of 35 per cent over rotary screw designs. The model features digitally controlled magnetic bearing system, which consists of permanent magnets and electromagnets that replaces conventional lubricated bearings. It uses two independent centrifugal compressor circuits, shell-and-tube evaporator and condenser components ranging in capacity from 120 t to 190 t. The touch screen controller provided allows user to retain cause of current fault and display last 25 fault conditions for troubleshooting.

The benefits of the frictionless chiller are many. RTCW chillers offer increased energy efficiency, the elimination of oil and oil-bearing parts, and provide considerably less vibration and noise with sound levels as low as 77 dBA. With the use of environmentally friendly R-134a refrigerant, RTCW chillers provide zero ODP.

With its compact, 35 inches wide design, the RTCW saves on installation time and costs and frees up valuable floor space. Maintenance is simple and less costly with the elimination of oil-bearing parts, providing increased reliability over screw compressors. Further, compressor speeds adjust automatically to match the load and operating conditions for maximum part load efficiency.

Contact: Mr. Kevin Chudyk, AEC Inc., 801 AEC Drive, Wood Dale, Illinois, IL 60191, United States of America. Tel: +1 (630) 595 1060; Fax: +1 (630) 595 6641.

Website: www.news.thomasnet.com

New NH3/CO2 cascade system

Grenco Marine, the Netherlands, reached the final of the Dutch Maritime Innovation award with one of its latest developments in the refrigeration technology an NH3/CO2 cascade system total screw compressor concept. After 2010, charging of existing installations with R22 refrigerant will not be allowed anymore in Europe. Alternative refrigerants like R507 and R404A are also subject to very strict legislation and are likely

to be prohibited in the near future, such as in Denmark from the 1 January 2006. By using natural refrigerants in new installations, fishing fleet owners can avoid problems of compliance with changing legislation.

Grencos new NH3/CO2 cascade system solves this problem by using two natural refrigerants ammonia (NH3) and carbon dioxide (CO2). Moreover, these natural refrigerants have very good thermodynamic properties. As CO2 has a high operating pressure (6.8 bar at -50C and 39.7 bar at 0C), a primary cooling system with another refrigerant needs to be installed in order to keep the CO2 pressure within limits in the secondary system. NH3 is the preferred choice, as its Coefficient of Performance (COP) is approximately 25 per cent better than R507 or R404A.

The screw compressors of Grenco are specially developed for CO2. Defrosting the plate freezers is done with hot gas from the compressor. To make this possible, the screw compressor is designed for higher discharge pressures and differential pressures.
The benefits of the system include:

Energy saving amounts up to 22 per cent compared with HFC-based cooling systems;

Greenhouse gas emission reduction of 70-90 per cent, achieved by reducing direct emissions;

Freezing time lowered by about 25 per cent, and freezing equipment reduced; and

Safe, natural and cheaper refrigerants that are easily available worldwide.

Contact: Mr. S. Kortleven, Grenco Marine, P.O. Box 205, 5201 AEs-Hertogenbosch, Netherlands. Tel: +31 (73) 620 3111; Fax: +31 (73) 623 1609

E-mail: marine@grenco.nl

Website: www.grenco.nl

Website: www.ship-technology.com

New generation vehicle air-conditioners

Visteon Corporation, the United States, is getting ready to commercialize a new generation of environmentally friendly R744 air-conditioning systems for vehicles. Visteon has delivered more than 20 prototype vehicles with R744 Climate Systems, which are undergoing trials with more than 10 vehicle manufacturers, besides running its own R744 test fleet of vehicles.

Compared with the traditional refrigerant R134a, the natural refrigerant R744 has more favourable thermodynamic properties which, in addition to improved fuel economy and passenger comfort, allow for better cooling performance. The R744 system operates at increased pressures that are three times higher than current systems. To ensure cooling capacity at high ambient temperatures, an additional component called an internal heat exchanger (IHX) is integrated into the accumulator (Accu/IHX).

The main advantages of Visteons R744 Climate System are:

Improvements in fuel economy Consumes up to 20 per cent less fuel than traditional R134a systems.

Reduction in emissions Significantly reduces the possibility of direct emission of greenhouse gases by replacing the current R134a with R744, a natural refrigerant. The improved fuel economy also reduces indirect emissions.

Potential for supplemental heating Use of Visteons fully integrated heat pump technology as a supplemental heat source in vehicles with fuel efficient engines improves the performance. It also gives the additional benefit of defrosting the windshield rapidly.

Contact: Visteon Corporation, One Village Centre Drive, Van Buren Township, Michigan, MI 48111, United States of America.

Website: www.visteon.com

Research on CO2 Cascade Refrigeration System

The use of carbon dioxide (CO2) as a refrigerant in supermarket systems is becoming increasingly popular in Europe. In the recent years, it has been applied in cascade and trans-critical solutions. The competitiveness of CO2 systems in supermarket refrigeration depends on its energetic and cooling performances, and on its installation and running costs.

The Department of Energy Technology of the Royal Institute of Technology, Sweden, has started a research project to:

Experimentally evaluate the CO2 cascade system as compared to a conventional supermarket system in terms of performance, controllability, energy efficiency and cost;

Study existing installations with respect to general experiences, leakages and oil quality (conduct oil tests and evaluations); and

Develop practical aspects of handling CO2 as a refrigerant with regard to required gas quality, charging methods, port and bottle design.

A CO2 system has been built at the IUC Ref Centre facility as a cascade arrangement with ammonia (NH3) as refrigerant in the high level and CO2 is the working fluid at the medium and low temperature levels. Its performance is being compared with a traditional supermarket refrigeration system with comparable capacity at the same facility. The NH3/CO2 cascade plant has many system variations, which will be used to test the basic arrangement. Thereafter, several modifications will be evaluated and alternative system arrangements compared with the reference arrangement. The experimental results will then be compared with a theoretical simulation model developed.

Contact: Mr. Samer Sawalha, Dept. of Energy Technology, Royal Institute of Technology, SE-100 44 Stockholm, Sweden. Fax: +46 (8) 203 007

E-mail: samer@energy.kth.se

Website: www.energy.kth.se

High-efficiency screw chiller

MaxETM water-cooled screw chillers from York International Corporation, the United States, now come with higher efficiency. These performance-tested chillers have Frick compressors with more than three per cent higher efficiency for maximum energy savings at both design and off-design conditions. The chillers capacity-control slide valve does not restrict the gas flow due to centrifugal compressor pre-rotation vane capacity-control, which greatly impacts on a centrifugal chillers part-load efficiency. As a result, the integrated part load value (IPLV) ratings of the MaxE screw chiller exceed those of many constant-speed centrifugal chillers by more than 25 per cent.

The MaxE chiller uses the zero-ODP HFC-134a refrigerant. It also has unit-mounted flow sensors for easier installation and simpler operation, and the OptiViewTM control centre with a large, full-colour, active-matrix display. This advanced control centre offers simple, intuitive navigation and a built-in interface that communicates with most building automation systems. Its full-screen display allows on-board trending of up to six different values, selected from more than 80 items, and provides advanced levels of security.

The versatile chiller also adapts easily to a variety of high-head cooling requirements, including brine cooling and thermal storage, eliminating the need for multiple chillers for significantly different night and day duties. The MaxE water-cooled screw chiller is available in 200 to 430TR capacities with a 60 Hz motor and in 170 to 365 TR capacities with a 50 Hz motor.

Contact: York International Corp., P.O. Box 1592, York, PA 17405-1592, United States of America. Tel: +1 (717) 771 7890; Fax: +1 (717) 771 7381.

Website: www.york.com

CO2 as a refrigerant in heat pumps

Shecco Technology, a part of Hydro Pronova AS in Norway, has patented a heat-pump technology that makes use of CO2 as the alternative refrigerant to HFC, which has a global warming potential 1,300 times that of CO2. The operating principle is that when liquid CO2 is induced into a heat exchanger and made to evaporate, it absorbs heat from the surroundings. Then the CO2 vapour is removed by a compressor, which increases the pressure and temperature of the gas. Heat can then be liberated by another heat exchanger in the high side of the circuit, thereby effecting a heat transfer from one place to another. Depending on the direction of the circulation, the system can be used for either heating or cooling. When using CO2 in a trans-critical cycle the process in which CO2 operates the high side pressure is supercritical (that is, above the highest pressure under which liquid and vapour can co-exist) of 7.4 MPa.

Shecco Technology enables simple and efficient operation of trans-critical systems through control of the supercritical pressure. The pressure can be controlled to maximize the efficiency or to regulate the capacity of the system. Several pressure control concepts are available with Shecco Technology, including active control of high side charge or volume, or passive methods for pressure adaptation at varying temperature. This makes Shecco Technology a flexible solution for a wide range of heating and cooling purposes.

Contact: Hydro Pronova A.S., Shecco Technology, Drammensv. 264 Vker, N-0240 Oslo, Norway. Tel: +47 2253 8100; Fax: +47 2253 7490.

Website: www.shecco.com

CO2 air-conditioning for automobiles

Delphi Corp., the United States, has developed new CO2 air-conditioning technology as part of its continuing research into alternative refrigerants. It has also developed an innovative concept of a reversible air-conditioning system using air-cooled heat pump technology. This concept allows for better integration into the vehicle and a higher performance-to-cost ratio over other functional concepts. When used with CO2, it prevents the entry of high-pressure refrigerant into passenger cabin, therefore eliminating in-cabin refrigerant leakage concerns and associated refrigerant noise in the heat pump mode. Delphis latest generation of CO2 compressor is reported as very competitive in performance, stability and controllability.

Contact: Delphi Corp., 5725 Delphi Drive, Troy, Michigan 48098-2815, United States of America. Tel: +1 (248) 813 2000; Fax: +1 (248) 813 2670.

Website: www.delphi.com

Frictionless centrifugal chiller

McQuay International, the United States, offers McQuay frictionless centrifugal chiller that utilizes oil-free, magnetic bearings in order to attain sound levels as low as 77 dBA. It operates from as low as 0.375 kW/t IPLV and features full load performance as low as 0.62 kW/t about 32 per cent more efficient than screw compressor chillers. The unit uses HFC-134a refrigerant, which has zero ODP, and is rated A1 (best) under ASHRAE Standard 34. The chiller incorporates MicroTech IITM controls with Protocol SelectabilityTM feature, which allows easy integration with the building automation system of choice. Variable frequency drives unload chiller to 10 per cent of full load.

Contact: McQuay International, P.O. Drawer 1551, Minneapolis, MN 55440, United States of America. Tel: +1 (763) 553 5330; Fax: +1 (763) 553 5177.

Website: www.news.thomasnet.com

SOLVENTS

Mould release products

The non-marking S-6 silicone spray mould release, from IMS Company in the United States, has a mid-range 6 per cent concentration for higher release ability. It is effective on ABS, acetal, nylon, acrylic, PMMA, polycarbonate, polyester, polyethylene, polypropylene, polystyrene, polysulfone, PPHOX, PPO and rubber. The L-6 paintable lecithin mould release is a medium concentration, medium viscosity lecithin product that minimizes crazing and stress cracking in polyethylene. It can be used for moulded parts that will be plated, painted, printed or hot-stamped. Both products are rated USDA H-1, approved for food packaging, and have no ozone-depleting substances.

Contact: IMS Company, 10373 Stafford Road, Chagrin Falls, Ohio 44023-5296, United States of America. Tel: +1 (440) 543 1615; Fax: +1 (440) 543 1069

E-mail: sales@imscompany.com

Website: www.news.thomasnet.com

Cleaning and drying of electronic assemblies

ISC Chemicals Limited of London, the United Kingdom, has obtained a patent for an alternative method of cleaning and drying, designed especially for electronic assemblies and components. The new process employs a highly fluorinated organic (HFO) compound together with a polar organic solvent of higher solvent power than the HFO.

The invention provides an alternative to chlorofluorocarbons (CFCs) that are being phased out. HFOs, in general, have very poor solvent power and are only partially miscible with most other solvents. However, HFOs are inert chemically and have very good compatibility with plastics. The functional hydrocarbon organic solvents such as aliphatic alcohols, acetals, ketones, nitriles and nitro-alkanes have relatively high solvent power especially with respect to polar soils. The invention combines the advantages of the two chemicals.

When the solvent is poured into a container, the surface is covered by an HFO-rich vapour layer, which transfers heat to the organic solvent. The component to be cleaned is brought into contact with the liquid organic solvent, and then vapour-rinsed or dried in the HFO-rich vapour layer. Both the HFO and the organic solvent are condensed and recycled.

Website: www.freepatentsonline.com

General-purpose cleaner/degreaser

Blue Shower G3TM from Techspray, the United States, is a non-ozone depleting, non-inflammable aerosol formula for general-purpose cleaning and degreasing. It is based on a patented technology that makes it a direct replacement for all cleaner/degreasers containing HCFC-141b, currently the most widely used solvent in the electronic aerosol cleaning industry. This new blend is designed for precision cleaning of polar and non-polar soils including hand and solder oils, greases, fluxes, silicones and other similar contaminants. Blue Shower G3 is a blend of Honeywells HFC-245fa and 1,2-trans-dichloroethylene. It is effective in cleaning electronic equipment, machinery, metal parts, etc. and comes in a 16-ounce aerosol can.

Contact: Tech Spray L. P., P.O. Box 949, Amarillo, Texas, TX 79105-0949, United States of America.

Tel: +1 (806) 372 8523; Fax: +1 (806) 372 8750.

Website: www.specialized.net

Non-ODS replacement for trichloroethane

CDTM Communications cleaner/degreaser, from American Polywater Corporation, is a unique and effective replacement for the ozone-depleting trichloroethane. It offers maximum solvency power on a wide range of telcom-specific grimes such as C-cement, filling gels, silicone greases, fluxes, lanolin and flooding compounds. The powerful solvent blend out-performs butyl/water, glycol/ether cleaners and trichloroethane.

As the CD Communications cleaner/degreaser evaporates more slowly than trichloroethane, exposure to vapours and solvent wastage are less. Parts can be dried with towelettes or forced air to accelerate evaporation, if needed. The product has a low level of toxicity and good ventilation is sufficient to keep vapours at safe levels. The solvent blend is a combustible liquid, but with a high flash point. The product is available with a pre-soaked, tear-resistant towelette in an easy-open foil pack. It is lso available in quart bottles with flip-top caps.

Contact: American Polywater Corporation, P.O. Box 53, Stillwater, MN 55082, United States of America. Tel: +1 (651) 4302 270; Fax: +1 (651) 4303 634.

Website: www.polywater.com

CFC-free degreasers

K-Chem Inc., the United States, offers CFC-free degreasers for different applications. Its Non-chlorinated High Dielectric Solvent is formulated without chlorinated solvents or other hazardous ingredients. It has a high dielectric strength and flash point, and is safe to use on all electrical apparatus. It is available in bulk and as aerosol.

The Fast Solvent Degreaser is a very powerful industrial solvent cleaner. It is fast-drying, non-inflammable, non-conductive and completely non-ozone depleting. The low-odour formulation leaves no residue and does not contain methylene chloride. A unique feature is the special dual-action valve that allows both a misting spray for broad area degreasing and a blasting spray for hard-to-reach areas and extra deposit removal power. The product can be used to remove grease, oil, dirt, and other deposits from power equipment, electric motors, printing presses, conveyor/escalators, and virtually any metal equipment or parts. Its dielectric strength makes it suitable for use on live electrical equipment.

Kwik Dry is a fast-drying, non-ozone depleting chlorinated solvent for degreasing. It dries of in 30 seconds without leaving any residue. Kwik Dry can be used on live electrical equipment because of its dielectric strength. It has no flash point and is non-inflammable. The product is sold in aerosol cans.

Contact: K-Chem Inc., P.O. Box 530632, Birmingham, Alabama, AL 35253 0632, United States of America. Tel: +1 (205) 592 0844; Fax: +1 (205) 592 8106

E-mail: info@k-chem.com

Website: www.k-chem.com

Solvent cleaning systems

Forward Technology, the United States, offers F-100 Series solvent cleaning system designed to safely employ all of todays non-inflammable and EPA-approved solvents. The compact system is an economical solution to solvent precision cleaning applications. A typical process includes immersion in the Crest ultrasonic cleaner to obtain unrivalled cleaning with HFC, HFE, NPB and HCFC solvents.

The F-300 Series super-heated ultrasonic vapour degreaser contains dual solvent immersion tanks with the patented Crest 40, 58, 132, or 192 kHz ultrasonics. The ceramic-enhanced ultrasonics produce excellent cleaning with HFC, HFE, NPB, and HCFC solvents.

Contact: Forward Technology, 3050 Ranchview Lane North, Plymouth, Minnesota 55447, United States of America. Tel: +1 (763) 559 1785; Fax: +1 (763) 559 3929.

Website: www.forwardtech.com

Aqueous cleaner/de-fluxer

Vitrex AT200 from Aqueous Technologies Corporation, the United States, is a specially designed aqueous amine blend designed for optimum performance on re-flowed solder pastes (no-clean, rosin, lead-free), tacky fluxes and uncured adhesives. Vitrex AT200, unlike other chemistries that produce dull solder joints, produces shiny surfaces. It is an all-temperature product, providing effective cleaning results at operating temperatures between 37o-71oC. It is cost effective with no sump-side additives required and has a long bath life.

Vitrex AT200 is multi-metal safe for use on yellow metals, aluminium, ferrous metals, composites and most precious metals. It is safe to use with PVDF, Teflon and ceramic elastomers and filters, and is best used in polypropylene or stainless equipment. It is a biodegradable aqueous solution, with less than 50 g/l VOC at 7.5 per cent, and contains no CFCs or HAPs. It is a non-flammable and non-corrosive liquid containing 2-aminoethanol.

Contact: Aqueous Technologies Corporation, 9055 Rancho Park Ct., Rancho Cucamonga, California, CA 91730, United States of America. Tel: +1 (909) 944 7771; Fax: +1 (909) 944 7775.

Website: www.aqueoustech.com

HALONS

Halon replacement options

Unitor ASA, Norway, currently offers two options carbon dioxide (CO2) systems and a foam system for halon

system replacement in sea-going vessels. In CO2 systems, Unitor offers mainly high-pressure cylinder systems, though low-pressure tank systems can be provided for very large applications. The system size (quantity of CO2) is about 2.25 times the current halon requirement. The advantages of CO2 systems include environment-friendliness, quick fitting, low electrical demand and worldwide availability of refill.

Unitors HotFoam system uses internal air and water from the emergency fire pump to generate foam at 660:1 expansion ratio, which fills the space to be protected at the rate of 2-3.5 m/min. It consists of a tank, pump, mixer and distribution valves. Cost efficiency, in addition to its unique extinguishing properties (fill space up to 5 times), low weight (20 per cent of a CO2 plant), space saving, and easy maintenance and application features make HotFoam a very competitive alternative.

Contact: Unitor ASA, Drammensveien 175, PO Box 300, Skyen, N-0213 Oslo, Norway. Tel: +47 2213 1415; Fax: +47 2213 4500

E-mail: web@unitor.com

Website: www.unitor.com

Halon alternative fire suppression system

In the United States, RedBrooks Laboratory (RBL) of the Doll Technology Group is developing the first Gate-to-Gate fire suppression system for commercial airliners. The novel combination of low-pressure dual fluid (LPDF) water mist and inert air is proving to be an effective halon replacement option in commercial aircraft cargo compartments.

LPDF water mist, as a total flooding agent, is very effective in controlling or extinguishing most fires. The unique nozzle produces 50 m diameter water droplets at pressures around 0.80-15 bar. Hypoxic air (inert air) has two functions: first as the part of the dual fluid system used to propel the water and the second as a reducer of the oxygen levels. When LPDF mist is combined with hypoxic air, the patented combination has far surpassed any halon alternative material tested to date.

Contact: Doll Technology Group, 640 West State Route 20, Sedro-Woolley, Washington, WA 98284, United States of America. Tel: +1 (360) 856 4426; Fax: +1 (360) 856 4688

E-mail: info@dolltech.com

Website: www.pyrogen.com

Water mist fire suppression technology

Fire researchers at the Institute for Research in Construction (IRC), Canada, have been carrying out both theoretical and experimental studies on water mist fire suppression technology. The research emphasizes effective and innovative methods of water mist delivery, including superheated water mist systems, IntelMistTM, pulsed discharge systems and portable extinguishers.

IRC research has shown that a pulsed discharge of water mist is more effective than a continuous discharge in putting out fires, including shielded and ventilated fires that cannot be extinguished by continuous discharge, with a shorter extinguishing time and less amount of water. A portable water mist extinguisher developed by IRC uses tap water as the extinguishing agent and is able to extinguish multiple types of fires, including wood and paper fires (Class A), liquid fuel fires (Class B), fires related to electronic/electric equipment (Class C) and cooking oil fires (Class K).

Contact: Dr. Zhigang Liu, Project Manager, Fire Research Programme, Institute for Research in Construction, National Research Council of Canada, 1200 Montreal Road, Ottawa, ON K1A 0R6, Canada. Tel: +1 (613) 990 5075; Fax: +1 (613) 954 0483

E-mail: Zhigang.Liu@nrc-cnrc.gc.ca

Website: www.irc.nrc-cnrc.gc.ca

Blended gas-based fire extinguishing system

Xian Xinzhu Fire & Rescue Equipment Co., Ltd. of China has developed a new type of automatic fire extinguishing system, which uses a mixture of nitrogen, argon and carbon dioxide as the extinguishing agent. The mixture is non-conducting, non-toxic, colourless and odourless, with zero ODP.

This extinguishing system works by reducing oxygen concentration around fire and thus smothering the fire. The gas mixture is in a container with a metal-membrane sealed valve, which ensures an excellent airtight seal. The equipment has multi-start mode electric, pneumatic, electric-manual or mechanical-manual) that ensures reliable start. The low-power electric start device reduces the start current needed, and lowers the power requirement for the control unit. Working pressure range of the system is 13.9-17.5 Mpa at a temperature range of 20 to 50 C. The extinuguishant is available in 3 l or 20 l container and it ejects within 60 seconds from start.

The system is flexible in that it can be an independent unit or a combined distribution system. Its application is almost identical to carbon dioxide and halon systems. It can be used for Class A, B and C fires, but not for fires involving chemical products with oxidants or active metal or metal hybrid.

Contact: Xian Xinzhu Fire & Rescue Equipment Co. Ltd., No. 17, 1st Tech Road, Xian Development Zone for High-Tech Industries, Xian, China 710075. Tel: +86 (29) 8814 2918, 8838 4679; Fax: +86 (29) 88384062

E-mail: xinzhu@pub.xaonline.com

Website: www.xaxinzhu.com

Water mist systems

Coastal Fire Sprinkler Co. in the United States designs, customizes, sells, installs and services three categories of Ultra Fog water mist systems.

Low-pressure system Similar to conventional water sprinkler system, with a working-pressure below 10 bar and water consumption 70-80 per cent that of conventional water sprinkler systems.

Medium-pressure system This water mist system works in the pressure range of 10 to 40 bar. The water consumption is about 50-70 per cent that of the conventional water sprinkler systems.

High-pressure system This water mist or water fog system has a working pressure range from 40 bar up to 100/150/200 bar (fog has smaller droplets than mist). It has certain advantages over the low- and medium-pressure systems, such as: total weight and the amount of water are reduced to a minimum; cooling effect is very high, and sizes of drain and scupper system are kept to a minimum.

Contact: Coastal Fire Sprinkler Co., Global Corporate Office, 8201 Peach Street, New Orleans, LA 70118, United States of America. Tel: +1 (504) 488 1212; Fax: +1 (504) 488 8847

E-mail: info@coastalfire.com

Website: www.coastalfire.com

FOAMS

Water-blown polyurethane refrigeration insulation

A leading chemicals and plastics manufacturer in South Africa, the CHC Group, has developed a 100 per cent water-blown polyurethane refrigeration insulation system. The system is being used by Frigoglass, one of the leading manufacturers of commercial refrigerators for companies such as Coca-Cola and South African Breweries.

The CHCs water-blown technology does not require an additional blowing agent and uses only CO2, which is obtained from the reaction of water with isocyanate. The water-blown system is inferior to the cyclopentane and HFC options in insulation property and requires higher foam density. However, water as a blowing agent has no cost and is thus an economically viable option. While cyclopentane is cost-effective, its high inflammability requires the factories to be adapted at high cost. HFC gives foam with good insulation properties at relatively low foam density. It does not require factory adaptation but is five to ten times more expensive than cyclopentane.

Water-blown technology, besides the economic benefits, offers excellent processability and flowability, and the fine cell structure of the rigid foam provides the insulation needed for commercial refrigerators.

Website: www.engineeringnews.co.za

Design of hydrofluoroether foam blowing agents using I-QSAR

In the United States, Tennessee Technological University and Sandia National Laboratories are jointly exploring a novel technique for molecular design by generating compounds to replace R-141b in polyurethane foam blowing applications. Known as the inverse quantitative structure-activity relationship (I-QSAR), this technique is based on using Signature, a newly developed descriptor, to solve the inverse problem of molecular design.

The work aims to optimize the properties of the candidate solutions based on the normal boiling point and the vapour-phase thermal conductivity. After generating more than 3 million solutions with this technique, the researchers have identified seven compounds for further study. These seven best candidates that form the focused database include straight chains and rings of a several sizes.

Contact: Department of Chemical Engineering,Tennessee Technological University, Box 5013, Cookeville, Tennessee 38505, United States of America; Or Department of Computational Biology, Sandia National Laboratories, P.O. Box 969, MS 9951, Livermore, California 94551-9951, United States of America.

Website: www.pubs.acs.org

Process for producing polyurethane

Researchers at Kao Corporation, Tokyo, Japan, have patented new processes for producing polyurethane (PU) and PU foam. The PU production process comprises reacting a polyol component with an isocyanate component in the presence of a dialkylaminoalkyl alcohol catalyst. The blowing agent used in the production of PU foam consists of water, low-boiling point hydrocarbons (such as isopentane, normal pentane and cyclopentane), natural gases (such as carbon dioxide and nitrogen) and chemical blowing agents such as HCFC-141b, -142b, -22, HFC-134a, -152a, -245fa, -245ca, -236ea and -365mfc. These can be used alone or in admixture of at least two kinds. The amount of the blowing agent differs depending upon its kinds and the density of the desired polyurethane foam.

Website: www.freepatentsonline.com

Pre-expanded EPS beads

StyroChem, the United States, offers modified expandable polystyrenes. M-500 offers fast expansion rates, low density potential and excellent yields in conversion from beads to rigid foam insulation billets. M-590 is an excellent product for moulding parts. Its fast cycle makes it attractive for moulding and/or billets of all sizes and thickness. The virgin beads have a bulk density of approximately 38-42 lb/ft3 and contain pentane, a hydrocarbon blowing agent and a flame-retardant additive.

Advanced StyroChem technology permits close control of M-500 and M-590 bead size, resulting in pre-expanded beads of exceptional uniformity and density. This helps control costs and maintains the quality and consistency of the finished rigid board. At high-altitude locations in areas of lower air pressure, StyroChems MA-500 resin offers expansion characteristics that make it particularly effective. The MA-500 fast-cycle resin comes in larger than conventional bead size.

Contact: StyroChem, 3607 N. Sylvania Avenue, Fort Worth, TX 76111, United States of America. Tel: +1 (817) 759 4400.

Website: www.styrochem.com

PU foam stabilizer

Dearmate Shichuang Chemical Co. Ltd., China, offers its products for application in the production of rigid foam, flexible foam, HR flexible foam and shoe soles. The stabilizers can be used in various systems with blowing agent such as cyclopentane, HFC-245fa and HFC-365/227. The company has the capacity to supply 2,500 tonnes per year. The products are reported competitively priced and to match in quality with similar products from major global suppliers.

Contact: Dearmate Shichuang Chemical Co. Ltd., 3A01-5 Fine Chemical Zone Nanjing Economic &Technical Development Zone, China. Tel: +86 (25) 8557 0505; Fax: +86 (25) 8557 6548

Website: www.demasc.com

Website: www.engnetglobal.com

Production of open cell rigid polyurethane foam

Researchers from Matsushita Refrigeration Company and Takeda Chemical Industries Ltd., Japan, have jointly patented a process for the production of open cell rigid polyurethane (PU) foam, using a substitute blowing agent for trichlorofluoromethane (R-11). The substitutes employed include HCFC-141b and methylene chloride. The method for producing open cell rigid polyurethane foam involves reacting a polyol, polymethylene polyphenyl polyisocyanate prepolymer, and a monool, diethylene glycol monomethyl ether. The substitute blowing agent is used alone or as a mixture with water, in the presence of a catalyst, a foam stabilizer and a cell opening agent. The resultant open cell rigid polyurethane foam has a cell size of about 200-250 m, and is suitable for use as a vacuum heat insulating material. The foam may be enclosed in a container under a vacuum of 0.1-0.01 mmHg readily attainable to provide a vacuum heat insulating material of a high heat insulating performance.

Website: www.freepatentsonline.com

FUMIGANTS

Research on methyl bromide replacement

With the phase-out of methyl bromide (MB) for soil fumigation, research to find alternative fumigants or other technologies continues on a number of fronts. These include mixtures of methyl iodide and chloropicrin (MI-CP), Telone C35 (TC35) and soil solarization.

MI-CP mixture (30:70) applied at a rate of 500 kg/ha was tested on runner and fruit farms for its effectiveness in disease control and/or weed control. In both farms, the mixture was as effective as MB-CP mixture in

controlling weeds. In runner farms the treatments did not affect the germination of leguminous seeds or plant production. On fruit farms, the MI-CP mixture was as effective as MB in controlling nutgrass and Fusarium wilt disease. Both treatments significantly out-yielded the non-fumigated plots, clearly demonstrating the value of MI-CP as a potential replacement for MB.

In trials conducted on fruit production farms at tow different sites, TC35 was compared with MB-CP mixtures (98:2 and 50:50), CP alone and metam sodium. All fumigants were applied at a rate of 500 kg/ha (metam sodium at 500 l/ha and 350 l/ha) to sites infested with Fusarium wilt disease. Results of the trials proved TC35 to be as effective as all other fumigants and more effective than the lower rate of metam sodium (350 l/ha).

Soil solarization was investigated in a three-year trial conducted at a site infested with Fusarium wilt disease. The trial compared three different types of plastic black, silver and clear laid over the soil early in the season to take advantage of the summer heat. Data gathered included fruit yield and survival of plants from Fusarium wilt. Results showed silver plastic to be the only treatment effective against Fusarium wilt, and produced significantly larger plants and better yields than other treatments.

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E-mail: callweb@dpi.qld.gov.au

Website: www.dpi.qld.gov.au

Promising alternative for methyl bromide

Arysta LifeScience Corporation, a global life science company based in Tokyo, Japan, has received the worlds first registration in Japan for iodomethane for broad-spectrum insect control on imported timber (JMAFF registration number 21407). Iodomethane was developed by the Methyl Bromide Alternative Urgent Development Programme. Iodomethanes Japanese registration is the result of a collaboration involving the Japan Fumigation Technology Association and Yokohama Plant Protection Station.

While the registration targets imported timber, Arysta has also been developing iodomethane as a soil fumigant. The chemical controls a broad range of soil-borne diseases, weeds, nematodes and fungi in high-value crops such as tomatoes, strawberries, peppers and melons. Non-food crop production (turf and cut flowers) and perennial crop replant (orchards and vine crops) are also promising iodomethane applications.

According to Dr. Christopher Richards, President and CEO of Arysta LifeScience Corporation, iodomethane will be an important alternative to methyl bromide because of its broad-spectrum control.

Contact: Arysta LifeScience Corporation, 38/39th Floor, St. Lukes Tower, 8-1, Akashicho, Chuo-Ku, Tokyo 104-6591, Japan. Tel: +81 (3) 3547 4500; Fax: +81 (3) 3547 4699

Website: www.arystalifescience.com

Website: www.archives.foodsafetynetwork.ca

Microbial optimization as methyl bromide replacement

A disadvantage of closed soil-less growing systems is the rapid dispersal of soil-borne pathogens by the recirculating nutrient solution. Active (sterilization) or passive (part of the resident microflora survives the treatment) disinfection of the nutrient solution may eliminate harmful pathogens.

Researchers at the Institute of Agricultural and Environmental Engineering, the Netherlands, tested the hypothesis that with passive methods, the suppressed microflora can be built up to prevent severe outbreaks of certain pathogens. The four-year project aimed to characterize the microflora and metabolites in the nutrient solution, to the dynamic behaviour of the microflora in the cultivation of tomato, cucumber and gerbera), and to demonstrate results to commercial users. Part of the crop was inoculated with Pythium aphanidermatum or Phytophthora cryptogea, while the nutrient solution was disinfected either with ultraviolet radiation (active method) or sand filtration (passive method) or not at all (control).

Results indicated that disinfection of the nutrient solution is needed to achieve proper yields. It was not proven that a suppressed microflora could be built up by a passive disinfection method, compared with active disinfection, although a shift in the composition of the microflora was detected. Application of certain antagonists did also shift the total microflora during cropping, but did not suppress the pathogens with the exception of a Trichoderma strain.

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Website: www.actahort.org

Low-pressure treatment for stored-product pests

Researchers at the Department of Entomology and Plant Pathology, Oklahoma State University, the United States, investigated the prospects of using low pressure that creates a low oxygen atmosphere to control stored-product insects. Eggs, larvae and pupae of Tribolium castaneum, Plodia interpunctella and Rhyzopertha dominica were exposed to 32.5 mm Hg in glass chambers at 25, 33, 37 and 40C for times ranging from 30 minutes to 144 hours. Time-mortality data were subjected to probit analyses and lethal dose ratios were computed to determine differences in lethal time (LT) values among all species-life stage combinations across the four temperatures.

Eggs of each species were the most tolerant to low pressure. Pupae of T. castaneum and R. dominica were more tolerant to low pressure than their larvae. Immature stages of R. dominica were more tolerant to low pressure than the immature stages of the other two species. In all cases, mortality increased with increasing exposure time to low pressure and also with increasing temperature.

Website: www.ipm.okstate.edu